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Self-reported adherence to the physical activity recommendation and determinants of misperception in older adults

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Abstract

We aimed to compare self-reported adherence to the physical activity recommendation with accelerometry in older persons and to identify determinants of misperception. The sample included 138 adults aged 65–75 y participating in the Longitudinal Aging Study Amsterdam. Participants completed a lifestyle questionnaire and wore an accelerometer for one week. More than half (56.8%) of the participants reported to adhere to the physical activity recommendation (in 5-minute bouts), however, based on accelerometry this percentage was only 24.6%. Of those who reported to adhere, 65.3% did not do so based on accelerometry. The misperceivers were older ($p < 0.009$), more often female ($p = 0.007$), had a poorer walking performance ($p = 0.02$), reported a lower social support ($p = 0.04$), and tended to have a lower self-efficacy ($p = 0.09$) compared to those who correctly perceived their adherence to the recommendation. These results suggest that misperception of adherence to the physical activity recommendation is highly prevalent among specific subgroups of older persons.

Introduction

Regular physical activity reduces the risk of chronic disease, falls, functional decline and early mortality in older persons (Nelson et al., 2010). The physical activity recommendation for older persons is to perform at least 30 minutes of moderate-intensity physical activity (MET 3) in 10 minute bouts on at least 5 days per week (Nelson et al., 2010). The Dutch recommendation is similar although as of yet the necessary duration of the bouts has not been specified (Kemper, Ooijendijk, & Stiggelbout, 2000). These recommendations serve as the basis for physical activity advice for older persons.

Prevalence data on the adherence to the physical activity recommendation is generally based on self-report. Percentages of older persons who report to adhere to the recommendation range from 14%–22% in the UK (National Centre for Social Research, 2005); 40.7% in the USA (Fontaine, Heo, & Bathon, 2004) to 56% in Sweden (Bergman, Grijbovski,

Hagströmer, Bauman, & Sjöström, 2008). However, studies conducted in (nationally representative) samples of older individuals using accelerometry to determine the adherence to the physical activity recommendation in these same countries, report much lower percentages (3%, 2%, and 31%, respectively) (Haris, Owen, Victor, Adams, & Cook, 2009; Troiano et al., 2008; Orsini et al., 2008). These direct comparisons within country should be carefully interpreted since the accelerometer results were based on bouts of 10 minutes duration, while the self-reported data from the UK and Sweden included all minutes of moderate and vigorous physical activity. However, the two studies conducted in the USA both used 10 minute bouts and data could be directly compared, showing a large discrepancy between subjective and objective results in older adults. Similar to studies in younger adults (Macfarlane, Lee, Ho, Chan, & Chan, 2006; Mäder, Martin, Schutz, & Marti, 2006; Boon, Hamlin, Steel, & Ross, 2010), data suggest a potential overestimation of the adherence to the physical activity recommendation by older persons (Harris et al., 2009; Tucker, Welk, & Beyler, 2011; Grimm, Swartz, Hart, Miller, & Strath, 2012). This overestimation may have important implications for the success of physical activity campaigns and individual advice. When older persons perceive their own physical activity level as sufficient, they will be less susceptible to health messages focusing on becoming more active and will be less likely to react. Furthermore, the overestimation will have consequences for the application of e.g. the Stages of Change concept (Prochaska & DiClemente, 1983) as persons will be classified in the wrong stage. Therefore, it is important to identify older persons who are more prone to misperceive their adherence to the recommendation, as this information will help the development of effective strategies for promoting active behavior and to differentiate these strategies for specific subgroups of older persons. To our knowledge, the present study is the first study to identify these subgroups.

The aim of this study was to compare the self-reported adherence to the physical activity recommendation with objective accelerometry data in a heterogeneous sample of older men and women in the Netherlands and to identify potential determinants of misperception.

Methods

Study participants

Data for this study were collected in the Longitudinal Aging Study Amsterdam, a prospective study of older persons aged 55–85 years. The sampling and data collection procedures and response rate have been described elsewhere in detail (Huisman et al., 2011). In summary, a random sample stratified by age, sex, and expected 5-year mortality was drawn from the population registers of 11 municipalities in three geographical areas in the West, North-East, and South of the Netherlands. In total, 3,107 subjects were enrolled in the baseline examination (1992–1993) and were representative of the Dutch older population. In 2002–2003, a new cohort of 1,002 men and women aged 55–65 years was added to the study using the same sampling procedures. Examinations have been conducted every 3 years and consist of a main and a medical interview in the participants' home and a self-administered questionnaire. The medical interviews were performed by trained nurses and all interviews were recorded to monitor their quality.

From the 2,165 participants who participated in the measurement cycle in 2005–2006, we selected the 1,421 participants who were <80 years of age, lived independently, had a good cognitive status (MMSE score >23 (Folstein & McHugh, 1975)), and were alive on January 15, 2007, for a sub-study on lifestyle. All selected persons received an extensive lifestyle questionnaire in February 2007 by mail. A total of 1,058 participants (response 74.5%) returned a completed questionnaire (326 no response, 18 refused, 8 not able due to physical or newly developed cognitive problems, and 11 deceased). Of the 647 participants who

indicated in the questionnaire that they would be willing to participate in an additional accelerometry study, 169 participants were randomly invited during a restricted time period to participate in the study. Of those, 12 participants refused because of acute health problems, 4 participants could not participate due to being abroad and 153 participants completed the study. The study was approved by the Ethics Review Board of the XXX, and informed consent was obtained from all participants.

Measurement of physical activity using accelerometry

The Actigraph accelerometer (Model GT1M; Actigraph Inc., Pensacola, FL) was used to objectively measure physical activity. The accelerometer measures 5.1×3.8×1.5 cm, is lightweight (42 g) and powered by a rechargeable lithium polymer battery. This is a biaxial analog piezo-capacitive sensor (we only used the data from the vertical axis) that integrates accelerations and decelerations to report data in counts.

The accelerometer together with an instruction brochure which included photographs of how to properly wear the accelerometer and a daily log booklet was sent to the participants by regular mail. After two days, a phone call was made to ensure that the package was received, the accelerometer was properly worn by the participants, and the instructions on how to complete the daily logs were clear. The accelerometer was attached to a 3 cm wide, tight elastic belt and was worn superior to the left iliac crest. Participants were briefed to wear the accelerometer for an 8-day period during waking hours and to return the accelerometer in the provided envelope. Activity was recorded using 1-min epochs. Participants also recorded in the daily log the time the accelerometer was put on right after waking and put off just before going to bed. When the accelerometer was not worn for some period during the day, the participants were instructed to record the start and end time of that period as well as the activity performed (e.g. showering or swimming). Participants' logs were checked for periods when the monitor was not worn and matched against the recorded data. Data periods with zero counts for 60 continuous minutes or more were considered invalid and data files with fewer than 10 h per day of valid data were excluded (Troiano et al., 2008). A total of 14 participants (9.2%) with fewer than 4 days of valid data were excluded (Troiano et al., 2008), as well as one participant (0.01%) who used crutches during the study period because of a recent knee operation. Valid accelerometry data from 138 remaining participants were used in the statistical analyses.

The accelerometry data were analyzed using MATLAB R2006a (The MathWorks, Inc.; Natick, MA). The time per day spent in moderate and vigorous physical activity (> 3 METs) was assessed using the 760 counts per minute cut point proposed by Matthews (2005). The 760 cut point indicates the accelerometry score per minute above which an activity is considered as moderately intensive. This cut-off was developed by measuring the accelerometry score for many moderate intensity activities including (brisk) walking and running but also moderate intensity lifestyle-oriented activities such as vacuuming and sweeping in a sample aged 19 to 74 years and mean body mass index (BMI) of 26 kg/m² (SD=6). The cut point of 760 provided the most accurate group level estimate of time spent in moderate intensity activity in comparison to direct measurement of oxygen consumption (Matthews, 2005). Only the time per day spent on moderate and vigorous physical activity in bouts of greater or equal to 5 minutes was used. When participants reported an activity in the log that they conducted without wearing the accelerometer and when the activity was of moderate or vigorous intensity, this time was added to the accelerometer time spent on moderate and vigorous activity. This time was added only after the above mentioned accelerometer criteria had been applied. For 10 participants one activity on a single measurement day was added (ranging from 25 to 120 minutes with a mean 60 minutes), and for one participant one activity on two measurements days was added (10 and 40 minutes). The activities only included swimming and all had a duration > 5 minutes. For 10

participants accelerometry data were collected on 4–6 days only. The relative number of days that the recommendation was met was calculated and applied to a full week to determine whether a participant would have met the recommendation.

Physical activity recommendation

The Dutch physical activity recommendation for older persons (age 55 years and older) is to perform at least 30 minutes of moderate-intensity physical activity (METs 3 to 4) on at least 5 days per week (Kemper, Ooijendijk, & Stiggelbout, 2000). The recommendation is communicated by the Netherlands Institute of Sport and Physical Activity, a nonprofit organization largely funded by the Dutch Ministry of Health, Welfare and Sports, through their website, national activities and campaigns, and the publication of brochures. This recommendation was carefully explained in the text of the lifestyle questionnaire using lay language. Furthermore, it was explained that it was not necessary to perform the activities for 30 minutes continuously, but that activities which lasted at least 5 minutes during the day could be added up. Examples of individual activities were not presented but participants were instructed to include both daily activities and sport activities that required at least a moderate physical exertion. After the written explanation, participants were asked whether they did or did not meet the physical activity recommendation using the following question (Nigg, et al., 1999): “Please mark the statement that applies to you: I did not know physical activity is good for me; I never thought about the Dutch physical activity recommendation; I thought about the Dutch physical activity recommendation, but do not know yet whether I want to meet it; I thought about the Dutch physical activity recommendation, but decided not to meet it; I decided to meet the Dutch physical activity recommendation but am not yet meeting it; I meet the Dutch physical activity recommendation but only for less than six months; I meet the Dutch physical activity recommendation for more than six months.” Participants recording the last two statements were considered to meet the physical activity recommendation.

Other variables

The following variables were obtained from the regular LASA measurement cycle conducted in 2005–2006: sex, date of birth, education level, body weight, body height, number of chronic diseases, and walking performance score. Level of education was categorized as low (elementary school or less), moderate, and high (higher vocational, college or university education). Body weight was measured without clothes and shoes using a calibrated scale. Body height was measured using a stadiometer. The BMI was calculated as body weight in kilograms divided by height in meters squared. Self-reported chronic diseases included pulmonary disease, cardiac disease, diabetes mellitus, arthritis, cerebrovascular diseases, peripheral atherosclerosis, and cancer. The number of chronic diseases was categorized into three groups: 0 (no disease), 1, and two or more chronic diseases. Walking performance was assessed as the time needed to perform a standardized walking test. The participants were asked to walk 3 m, to turn around and to walk back 3 m as quickly as possible. Scores of 1 to 4 were assigned, corresponding to the quartiles of time needed to complete the test, with the fastest times scored as 4. Those who could not complete the test were assigned a score of 0.

Self-reported physical activity level was assessed using the validated LASA Physical Activity Questionnaire (LAPAQ) which was included in the lifestyle questionnaire (Stel et al., 2004). Based on the self-reported frequency and duration of walking, bicycling, light and heavy household activities, and sports activities in the past two weeks, the time spent on total physical activity, walking activity, bicycling, and sports activity was calculated in minutes per day. In addition, the mean time watching television per day was recorded in hours per day.

Intention to perform behavior underlies the Theory of Planned Behavior and largely accounts for the actual behavior (Ajzen, 1991). Three determinants of intention (attitude, subjective norms and perceived behavior control) were hypothesized to influence potential misperception. Attitude toward adherence to the Dutch recommendation for physical activity was assessed with five items using five-point Likert scales (adherence to the recommendation is unpleasant-pleasant; unappealing-appealing; bad-good; unhealthful-healthy; not worth the effort-worth the effort). Each response was scored from -2 to +2. The internal consistency as checked with Cronbach's alpha was 0.92. Social support toward adherence to the Dutch recommendation for physical activity was assessed with two items using five-point Likert scales (significant others adhere to the recommendation; significant others stimulate me to adhere to the recommendation; completely disagree-completely agree, Cronbach's alpha 0.63). Self-efficacy toward adherence to the Dutch recommendation for physical activity was assessed with two items using five-point Likert scales (how certain are you to meet the recommendation; very uncertain-very certain; and how hard or easy is it for you to meet the recommendation; very hard-very easy; Cronbach's alpha 0.88). Mean scores were calculated for attitude, social support and self-efficacy.

Statistical analysis

All analyses were conducted using SAS software version 9.1.3 (SAS Institute Inc., Cary NC, USA) and were carried out for the total sample as well as separately for men and women. P-values were based on two-sided tests and were considered statistically significant if less than 0.05. To investigate the representativeness of the accelerometry sample, differences in continuous variables between those included in the accelerometry sample and those not included in the sample were tested using the Student's t-test and differences in categorical variables using Chi-square tests. Similar tests were used to examine differences between men and women and between those who misperceived and correctly perceived their adherence to the physical activity recommendation. Participants who reported to meet the physical activity recommendation but did not do so based on the accelerometer data were considered overestimators. Those who reported not to meet the physical activity recommendation, but did so based on the accelerometer data were considered underestimators. All other participants were considered to correctly perceive their adherence to the physical activity recommendation.

Results

First we investigated whether the accelerometry sample was representative of the total sample of the lifestyle study. The characteristics of the sample (n=138) were compared with those of the participants who participated in the lifestyle study but had no valid accelerometry data (n=920). The accelerometer sample was older (71.1 versus 68.6 y, $p<0.0001$, age range was 65 to 75 years) but had a similar gender distribution, education level, body mass index, number of chronic diseases, walking performance and self-reported physical activity level in the past two weeks (Table 1). The accelerometer sample tended to have a more positive attitude towards meeting the physical activity recommendation (0.77 versus 0.67, $p=0.06$), but reported a similar social support and self-efficacy.

Seven or more valid accelerometer data collection days were obtained from 128 participants (92.8%). Two participants had data from 4 days, one from 5 days and seven from 6 collection days. The mean valid accelerometer time per day was 911 (SD=55) minutes and the mean counts per minute were 246 (SD=106) (Table 1). After including any swimming activities from the daily logs, the mean time spent in at least moderate intense physical activity in bouts of at least 5 min was 33 (SD=29) min/d. Figure 1 shows the percentage of participants who adhered to the Dutch physical activity recommendation based on the objective accelerometry data and using the cut point of 760 counts per minute to indicate

moderate to vigorous activity. For 17.4% of the study sample the threshold of 30 minutes per day was not reached on any day of the week. Only 5.8% of the sample reached this threshold every day of the week. Based on the accelerometry data, the Dutch physical activity recommendation for older adults was met by 24.6% of the study sample. This percentage was higher for men (31.0%) than for women (17.9%, $p<0.01$).

After reading a thorough explanation of the Dutch recommendation for physical activity for older adults in the lifestyle questionnaire, 56.8% of the participants reported that they adhered to this recommendation. Self-reported adherence was higher for women (65.5%) than for men (48.5%, $p<0.05$). Only 56.8% of the study sample had a correct perception of their adherence to the Dutch recommendation for physical activity and correctly reported to adhere (19.7%) or not to adhere (37.1%) to the recommendation ($p=0.007$). Few participants (6.1%) underestimated their adherence to the recommendation. However, over one-third of the total study sample (37.1%) overestimated their adherence level when compared to the accelerometry data. Of the participants who reported to adhere to the recommendation, only about one-third (34.7%) actually did so based on the accelerometry data.

Participant characteristics were compared between those who correctly and those who incorrectly reported to adhere to the physical activity recommendation (Table 2). Persons who overestimated their adherence to the recommendation were more likely to be older, females, and had a poorer walking performance. They also reported a lower social support ($p=0.04$) and tended to report a lower self-efficacy regarding meeting the physical activity recommendation ($p=0.09$). Education level, body mass index, number of chronic diseases, and attitude were not related to overestimation of adherence to the recommendation ($p>0.24$).

Discussion

This study directly compared self-reported adherence to physical activity recommendation with objective information using accelerometry in older persons. A unique aspect is the identification of participant characteristics related to misperception.

About half of the study sample (56.8%) reported adherence to the recommendation; however, only 24.6% met the recommendation based on objective measurements by accelerometry. As the exact same definition of the recommendation was used, including bouts of at least 5 minutes, a valid direct comparison of the results could be made. According to the accelerometer data, 65.3% of those who reported adherence did not achieve the recommendations, suggesting a misperception in the amount of physical activity performed, or misperception of the physical activity recommendations. The estimated percentage of older persons adhering to the physical activity recommendation based on accelerometry in our study was very similar to estimates from three other studies (24.2%, 22%, 24.6%) using similar cut points to determine moderate intensity activity in older populations (Orsini et al., 2008; Grimm, Swartz, Hart, Miller, & Strath, 2012; Copeland & Eslinger, 2007). The percentage is also similar to other European estimates based on accelerometry data in older persons (Davis & Fox, 2007). Even when in the current study the recommendation was lowered from 30 minutes to 25 minutes per day using the results of a sensitivity analysis, only 33.3% achieved adherence. These objectively measured data again show an even more inactive lifestyle in older persons than published data based on self-report.

The identification of participants who misperceive their adherence to the recommendation is a novel aspect of our study. Female gender, older age and lower walking performance were associated with a greater likelihood of misperception. The frequent misperception of

adherence to the physical activity recommendation may indicate that specific subgroups of older persons overestimate their level of physical activity. Other studies conducted in younger adults provide support for this explanation (Macfarlane, Lee, Ho, Chan, & Chan, 2006; Boon, Hamlin, Steel, & Ross, 2010; Duncan, Sydeman, Perri, Limacher, & Martin, 2001). Reporting bias was shown to be more severe for activity intensity than activity duration (Boon, Hamlin, Steel, & Ross, 2010; Duncan, Sydeman, Perri, Limacher, & Martin, 2001). It was shown that inactive adults tend to overestimate the intensity of their activity, specifically for moderate activities (Duncan, Sydeman, Perri, Limacher, & Martin, 2001). This may explain our observation that older persons with a relatively poor walking performance were more likely to misperceive their adherence to the recommendation. It is likely that older persons with a poorer performance rated their physical activities at a higher intensity level compared to those with a better performance. Alternatively, we cannot exclude that the accelerometer may not correctly determine the intensity of physical activities in frailer persons. There is some evidence that during walking at the same speed, older persons have higher energy expenditure as compared to younger persons (Voorrips, van Acker, Deurenberg, & van Staveren, 1995; Durnin & Mikulicic, 1956). This could be partly due to shorter stride length and lower step frequency, but also by a decrease in the efficiency of movements which may not be captured by accelerometry. However, the accelerometer used in our study showed good validity when compared with the doubly labeled water method (Plasqui & Westerterp, 2007) and when compared with oxygen consumption during a one-hour standardized physical activity protocol in older persons with COPD (van Remoortel et al., 2012) suggesting that the accelerometer is able to measure the intensity levels correctly in older persons with chronic disease. However, more validation studies are needed in heterogeneous groups of older persons to further investigate discrepancies between self-report and accelerometry in older persons.

Older persons reporting a low social support were more likely to misperceive their adherence to the recommendation. In particular the item 'significant others adhere to the recommendation' was scored lower in the overestimators (0.53, SD=0.65) compared to the correct perceivers (0.96, SD=0.61, $p=0.008$) on a scale from -2 to +2. This downward comparison among overestimators was reported before in younger adults (Lechner, Bolman, & van Dijke, 2006). People intentionally look for people who are less physically active than themselves, in order to feel reassured about their own behavior (Wood, 1996). Persons reporting a lower self-efficacy tended to be more likely to misperceive their adherence to the recommendation. In older persons, exercise self-efficacy is strongly associated with the amount of exercise undertaken (Lee, Arthur, & Avis, 2008). Based on the Theory of Planned Behavior (Ajzen 1991) lower social support and lower self-efficacy are expected to lead to a lower motivation, which in turn may lead to a lower physical activity level. A low level of activity may increase the likelihood for misperception.

It should always be acknowledged that a discrepancy between self-report and accelerometer data could also be caused by the accelerometer not capturing all the physical activities performed. A unique aspect of our study is that activities performed while not wearing the accelerometer, such as swimming activities, were recorded in a daily log and were accounted for in the data analyses. If the recorded activity had a sufficient intensity level and was performed for at least 5 minutes, the activity time was added to the total activity time as assessed by the accelerometer. The discrepancy could also be caused by the inaccuracy of hip-worn accelerometers during some physical activities, such as bicycling. However, according to the LAPAQ questionnaire, the time spent cycling did not differ significantly between the overestimators (10.0 $\pm$ 15.1 min/d) and the correct perceivers (9.5 $\pm$ 9.8 min/d, $p=0.87$), suggesting that this activity was not the major cause of the misperception. Also, the percentage of older adults who reported performing bicycling activities was similar between the two groups, 60.4% versus 68.0% ($p=0.52$).

A limitation of all accelerometer studies is that no generally accepted cut-points exist for the identification of moderate- to vigorous-intensity physical activity in older persons. Following established protocols, we used the cut point of 760 counts per minute (Grimm, Swartz, Hart, Miller, & Strath, 2012; Matthews, 2005). A recent study conducted in older persons suggested a cut point of 1,041 count per minute optimal to indicate moderate and vigorous physical activity in older persons (Copeland, & Eslinger 2009), supporting our decision to use a lower cut point for older individuals as compared to young adults (Freedson, Melanson, & Sirard, 1998). When we applied the Freedson cut point to our data, adherence to the physical activity recommendations based on accelerometry would drop to only 5.1% and overestimation of adherence would increase to 92% of the sample. These analyses suggest that the percentage of older persons objectively adhering to the recommendation and the degree of misperception reported in our study may be rather conservative estimates. A second limitation is that actual knowledge regarding the recommendation was not measured. Even though the recommendation was carefully explained in the questionnaire, misperceptions may be caused by inaccurate awareness as well as inaccurate knowledge, and the discrepancy in the use of bouts between the Dutch recommendation and the recommendation used in this study. Also, the question used to determine adherence to the recommendation has not been validated for that purpose in previous studies. A final limitation is the relatively small sample size of the current study and the results need to be confirmed in other, larger, study samples. However, the sample included in the statistical analyses was similar to the total sample from the lifestyle study with regard to demographic, health and lifestyle variables. This makes it less likely that those who were willing to participate in the accelerometry study had a non-representative physical activity level. Furthermore, the percentage of older persons who reported to adhere to the physical activity recommendation in our study (56.8%) was very similar to national data collected in 2007 among Dutch adults aged 65 years and older (58%) which again supports the representativeness of the sample (Netherlands Health Statistics, 2010).

In conclusion, the results of our study suggest that self-reported adherence to the physical activity recommendation is overestimated by one-third of the older population. Women, those at older age, and those with a slow walking speed were more likely to overestimate their adherence to the recommendation. Furthermore, lower social support and lower self-efficacy were related to misperception. Education level, BMI and attitude towards the recommendation were not related to misperception. The high prevalence of misperception should be confirmed in large, heterogeneous samples of older adults using different objective methods to assess physical activity. When confirmed, the overestimation may seriously hamper the effectiveness of health promotion campaigns and physical activity advice in these specific subgroups of older persons. Specific strategies should be developed for the identified subgroups of older adults who overestimate their physical activity. Future studies should investigate whether objective assessment of physical activity by time-use diaries or pedometers, or personalized feedback in the identified risk groups may increase awareness about their insufficient physical activity levels (Oenema 2003). Health educators should first address this awareness before targeting psychosocial determinants to increase physical activity in older persons.

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Figure 1.

The number of days per week that older persons achieve 30 minutes of at least moderate intensity physical activity in bouts 5 min based on accelerometry data. Black bars indicate those who adhere to the physical activity recommendation.

Table 1

Characteristics of the older participants of the Longitudinal Aging Study Amsterdam who participated in the accelerometry sub-study and those who did not

	Accelerometry sample	Not in sample	p-value
N	138	920	
Male gender (%)	51.5	46.9	0.31
Age (y)	71.1 (2.7)	68.6 (6.4)	<0.0001
Education (%)			
Low	21.9	21.7	0.85
Medium	57.7	55.8	
High	20.4	22.5	
BMI (kg/m ²)*	27.4 (4.1)	27.5 (4.1)	0.64
Number of chronic diseases			
0	33.3	33.4	0.79
1	40.6	38.0	
2 or more	26.1	28.6	
Walking performance score**	3.1 (1.1)	3.0 (1.2)	0.38
Television viewing (h/d)	3.2 (1.5)	3.3 (1.7)	0.69
Self-reported walking activity (min/d)	44 (44)	41 (48)	0.56
Self-reported bicycling activity (min/d)	11 (15)	9 (12)	0.09
Self-reported sports activity (min/d)	15 (22)	18 (29)	0.14
Self-reported total activity (min/d)***	154 (96)	155 (109)	0.98
Attitude	0.77 (0.54)	0.67 (0.58)	0.06
Social support	0.42 (0.71)	0.36 (0.70)	0.32
Efficacy	0.55 (0.87)	0.50 (0.81)	0.49
Self-report adherence to the physical activity recommendation (%)	56.8	56.1	0.87
Accelerometer wear time (min/d)	911 (55)	-	
Accelerometer wear time, including time from logs (min/d)	912 (55)	-	
Counts per minute	246 (106)	-	
Sedentary time (min/d)	599 (75)	-	
Moderate and vigorous activity time (min/d)****	85 (43)	-	

	Accelerometry sample	Not in sample	p-value
Moderate and vigorous activity time in bouts of 5 minutes (min/d) ****	33 (28)	-	

* Available for n=134 in accelerometry sample and for n=892 not in sample.

** Available for n=917 not in sample.

*** Based on self-reported frequency and duration of walking, bicycling, light and heavy household activities and sports activities in the past two weeks.

**** includes time spend on swimming activity when accelerometer was not worn and as reported in daily logs.

Table 2

Characteristics of older persons who reported meeting the Dutch physical activity recommendation, stratified by those who overestimated and those who correctly perceived meeting this recommendation based on the accelerometry data.

	Overestimation	Correct perception	p-value
Female gender (%)	67.3	34.6	0.007
Education (%)			
Low	20.4	15.4	
Medium	55.1	65.4	
High	24.5	19.2	
Age (y)	71.4 (2.6)	69.6 (3.1)	0.009
Body mass index (kg/m ²)	26.7 (3.4)	26.3 (3.5)	0.67
Number of chronic diseases			
0	34.7	34.6	0.74
1	42.9	50.0	
2 or more	22.5	15.4	
Walking performance score	3.0 (1.0)	3.6 (0.8)	0.02
Television viewing (h/d)	3.2 (1.3)	2.9 (1.3)	0.27
Self-reported bicycling activity (min/d)	10 (15)	10 (10)	0.87
Self-reported walking activity (min/d)	50 (36)	58 (49)	0.44
Self-reported sports activity (min/d)	18 (29)	24 (19)	0.39
Self-reported total activity (min/d)	167 (75)	156 (94)	0.61
Attitude	0.88 (1.01)	1.02 (0.50)	0.24
Social support	0.43 (0.60)	0.77 (0.75)	0.04
Self-efficacy	0.86 (0.56)	1.10 (0.60)	0.09